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10/679,151

10/06/2003

Naomasa Shiraishi

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OLIFF & BERRIDGE, PLC

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EXAMINER

MATHEWS, ALAN A

ART UNIT

PAPER NUMBER

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MAIL DATE

DELIVERY MODE

08/04/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/679,151 | Applicant(s) SHIRAISHI, NAOMASA | |
| | Examiner ALAN A. MATHEWS | Art Unit 2851 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 42-57, 70-74 and 90-92 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 42-57, 70-74 and 90-92 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Receipt is acknowledged of the Appeal Brief filed 30 April 2006. After careful consideration of applicant's remarks, a new ground of rejection is being applied against claims 42-57, 70-74, and 90-92 and prosecution of this application is reopened. The finality of the previous office action is withdrawn. The delay is regretted. Accordingly, the PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

Withdrawal of 35 USC 112 (first paragraph)

2. The rejection of claims 42-57, 70-74, and 90-92 under 35 USC 112 (first paragraph) is withdrawn.

Double Patenting

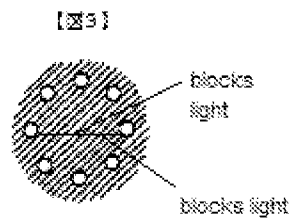
3. Claims 42-57, 70-74, and 90-92 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 94-115, 117, 118, 126-129, 131-135, 143-168, 173, 182-188, 190-192, and 196-198 of copending Application No. 08/376,676 in view of either the Japanese patent document JP 61-91662 or Suzuki et al. (U.S. Patent 4,871,257). Claims 94-115, 117, 118, 126-129, 131-135, 143-168, 173, 182-188, 190-192, and 196-198 of copending Application No. 08/376,676 disclose a pattern having linear features extending along orthogonal first and second directions and discloses a light source having a decreased intensity at

a center thereof and one first and second axes along the first and second directions, respectively. Thus, the device in claims 94-115, 117, 118, 126-129, 131-135, 143-168, 173, 182-188, 190-192, and 196-198 of copending Application No. 08/376,676 disclose all the claimed recitations of claims 42-57, 70-74, and 90-92 of the instant application except for the movable optical element and an exchangeable optical element. The Japanese patent document JP 61-91662 discloses in figure 5 a movable optical element 9. The stop shown in figure 3 can be exchanged for the stop shown in figure 5 as disclosed on page 8, lines 23-26 of the translation. The Japanese patent document JP 61-91662 further discloses on page 10, lines 4-16, moving or exchanging input lens 4. Suzuki et al discloses in figure 18 moving or exchanging stops 9. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to the claims 94-115, 117, 118, 126-129, 131-135, 143-168, 173, 182-188, 190-192, and 196-198 of copending Application No. 08/376,676 with a movable optical element and an exchangeable optical element in view of either the Japanese patent document JP 61-91662 or Suzuki et al. for the purpose of providing more adjustability and thus making the device in claims 94-115, 117, 118, 126-129, 131-135, 143-168, 173, 182-188, 190-192, and 196-198 of copending Application No. 08/376,676 more versatile.

This is a provisional obviousness-type double patenting rejection.

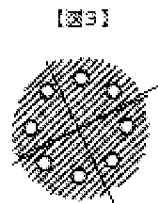
Claims 42-57, 70-72, 90-92 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese patent document 61-91662 in view of Jewell et al. (U. S. Patent No. 4,947,413) or the Japanese patent document JP 61-41150. The

Japanese patent document 61-91662 discloses in figure 5 a primary light source 1 and an illumination device 11, 4, 5, 9, and 7. Element 5 (optical integrator) in figure produces the secondary light source (see page 2, lines 1-12 of the translation). The aperture stop shown in figure 3 can be substituted for aperture stop 9 in figure 5. Page 8, lines 23-26, of the English translation states "The configuration of the present invention may be the same as the configuration of a conventional device as shown in figure 5 or figure 6, with one of the stops shown in figures 1 to 4 mounted in place of aperture stop 9". Page 10, lines 41-45 further states "Figures 1 to 4 are planar diagrams showing stops used to control the secondary light source as special stops that can be applied to the projection and exposure device of the present invention, figure 5 is a drawing of the configuration of a representative type of conventional projection and exposure device ---". Page 8, lines 16-19 of the translation further describes the aperture stop in figure 3 by stating "The stop shown in figure 3 is a stop which has **several** or a plurality of small openings only at the periphery, and this stop can be made by making holes in a metal plate or the like." In a first analysis of JP 61-91662, the aperture stop in figure 3 would cause the secondary light source to have decreased intensity portions at the center due to the blockage by the stop in the center, and the aperture stop would cause the secondary light source to have decreased intensity portions along at least part of the X and Y axis due to blockage of light by the aperture stop before the apertures as shown below.



It is further noted that the expression "decreased intensity portion" is a relative expression, but Applicant has not recited what "decreased" is relative to. Decreased from what?

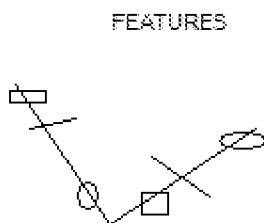
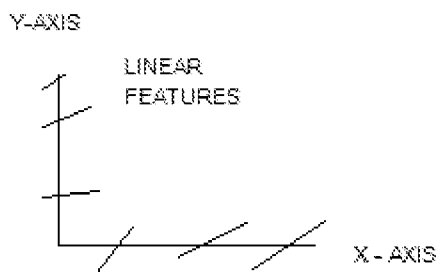
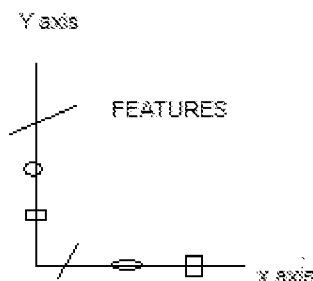
In a second analysis of JP 61-91662, the orthogonal axes in the stop shown in figure 3 can be drawn rotated 22 degrees from the horizontal axes as show below.



The light intensity distribution would then have an decreased intensity portion relative to a portion including a center and relative to the above stated first and second orthogonal axes at 22 degrees. Element 14 in figure 5 is the projection optical system for projecting on a plane at 15, an image of the pattern (from reticle 8) illuminated with light from the secondary light source. The aperture stop 9 in figure 5 is **"exchangeable"** with other apertures stops in figures 1-4 as disclosed on page 8, lines 23-26, and page 10, lines 35-37, of the translation. The Japanese patent document JP 61-91662 further

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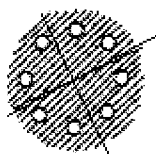
discloses on page 10, lines 4-16, **moving or exchanging input lens 4**. Phrases like “linear features extending along orthogonal lines” and “features extending along orthogonal first and second directions” are very broad, as illustrated in the diagrams below showing features or linear features extending along orthogonal axis.



One meaning of the word "extend" is "to arrange in a given direction so as to reach a particular point". Not all the features or components would have to be on the orthogonal axis, but only some of the features need to be on the orthogonal axis.. The Japanese patent document 61-91662 discloses a **fine pattern on reticle 8** (see page 4, line 40 of the English translation). This fine pattern on reticle 8 in the Japanese patent document 61-91662 would likely have at least some features extending along some type of orthogonal axis (but JP 61-91662 does not explicitly disclose this) Thus, the Japanese patent document 61-91662 discloses the invention except for explicitly disclosing that the fine pattern on reticle 8 of the Japanese patent document 61-91662 has features or linear features or components along orthogonal directions and correlating these features or components or linear features with the blocking portion of the aperture stop. Jewell et al. discloses in figure 2 and column 4, lines 39-53 that it is well known in the photolithography art to provide the reticle or mask with linear orthogonal features as shown at "D". Jewell et al. even discloses these linear features extending in different directions than vertical and horizontal in "B" and "E" of figure 2. The Japanese patent document JP 61-41150 discloses in figures 1b and figure 2a a reticle 14 having orthogonal linear features. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the Japanese patent document 61-91662 with linear features in view of Jewell et al. or the Japanese patent document JP 61-41150 for the purpose of making the device in the Japanese patent document 61-91622 more useful to different circuit patterns.

4. Claims 42-57, 70-74, and 90-92 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese patent document 61-91662 in view of Jewell et al. (U. S. Patent No. 4,947,413) and in further view of Susuki et al. (U. S. Patent No. 4,871,257). The Japanese patent document 61-91662 discloses in figure 5 an exposure system for projecting a **fine pattern** on reticle 8 (page 4, line 40 of the translation) onto object or workpiece (wafer) 15. The light source includes element 1 and aperture stop 9. Figure 3 discloses an aperture stop which is interchangeable with aperture stop shown 9 in figure 5 (see page 7, lines 37-42, and page 8, lines 1-22, of the English translation). If one drew a line 22 degrees from the horizontal, the stop in figure 3 would block the light along plane of incidence along the plane 22 degrees from the horizontal. Drawing a second line 22 degrees from the vertical would be orthogonal to the first line and would block the light along the plane 22 degrees from the vertical (see drawing below).

【図3】



Thus, **the aperture stop in Japanese patent document 61-91662 would produce decreased intensity portions at a center thereof and on first and second axes defined to intersect with each other at the center.** The light from the other apertures

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would be a pair of paths which are symmetrical with each other with respect to the plane of incidence. The aperture stop 9 in figure 5 is “**exchangeable**” with other apertures stops in figures 1-4 as disclosed on page 8, lines 23-26, and page 10, lines 35-37, of the translation. The Japanese patent document JP 61-91662 further discloses on page 10, lines 4-16, **moving or exchanging input lens 4**. In addition, other optical elements in figure 5 or figure 6 in the Japanese patent document 61-91662 would be movable (to allow for some adjustment so that the image on the wafer 15). Thus, the Japanese patent document 61-91662 discloses the invention except for specifically disclosing that the fine pattern on reticle 8 of the Japanese patent document 61-91662 has linear features and correlating these linear features with the blocking portion of the aperture stop. Jewell et al. discloses in figure 2 and column 4, lines 39-53 that it is well known in the photolithography art to provide the reticle or mask with linear orthogonal features as shown at “D”. Jewell et al. even discloses these linear features extending in different directions than vertical and horizontal in “B” and “E” of figure 2. Jewell further discloses spatial filter 22 in figures 1, 3 and 4. Suzuki et al. '257 discloses in figures 2, 5, and 13, using an aperture plate P_c having apertures at 45 degrees from the horizontal. In particular, **figure 13 of Suzuki et al. '257 discloses apertures in four quadrants**. Thus, the aperture plate would block light along the X and Y axis (see figure 13 below).



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In addition, Suzuki et al. '257 discloses in column 6, lines 3-6 and 35, and column 7, line 68, and column 8, line 1, the use of orthogonal lines in the circuit pattern and correlates the apertures in the aperture plate with these orthogonal lines. **In addition, figure 18 in Suzuki et al.'257 also discloses moving or exchanging stops.** Other optical elements in Suzuki et al.'257 would be movable for adjustments. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the Japanese patent document 61-91662 with linear features in view of Jewell et al. for the purpose of making the device in the Japanese patent document 61-91622 more useful to different circuit patterns. It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to provide the modified device of the Japanese patent document 61-91662 and Jewell et al. with these linear features correlated with orthogonal light blocking means along the X and Y axes in view of Suzuki et al. '257 for the purpose of making a better final product. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the modified device of the Japanese patent document 61-91662 and Jewell et al. with an exchangeable optical element in view of Suzuki et al.'257 for

the purpose of making the modified apparatus more versatile (although the Examiner still maintains that the stops in the Japanese patent document 61-91662 are exchangeable).

With respect to Applicant's arguments, the Examiner respectfully disagrees that figure 3 in the Japanese patent document 61-91662 (Horiuchi et al.) provides an annular illumination. The Japanese patent document 61-91662 discloses in figure 3 an aperture stop with eight apertures. Page 8, lines 16-18, describes figure 3 as having **several** openings. Figure 3 in the Japanese patent document 61-91662 does not show a continuous annular light. Alternatively, if Applicant continues his argument that figure 3 in the Japanese patent document 61-91662 provides annular light, then maybe Applicant's figure 7 in the instant application provides annular light, since the centers of the 4 apertures in figure 7 could be connected by a circle. Secondly, the argument that the apertures in figure 3 of the Japanese patent document 61-91662 merely provide a mechanical connection between the inner light blocking portion and the outer light blocking portion is not understood. It is not seen how apertures can provide a connection to anything, since apertures are the absence of structural material. With respect to Applicant's arguments concerning Suzuki et al. '257, the Examiner is using Suzuki et al. '257 to show aperture plate P_c in illumination system S_c in figure 2 to exposure a mask at the plane "o". The aperture plate P_c could be in the shape shown in figure 5 or figure 13. The Examiner is not using the system S_i .

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALAN A. MATHEWS whose telephone number is (571)272-2123. The examiner can normally be reached on Monday through Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571) 272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alan A. Mathews/
Primary Examiner
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